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12. STUNTED GROWTH IN CAPTIVE-REARED GHARIAL

Captive-reared crocodilians are often very stunted as a result of inadequate husbandry conditions with consequent delay in attainment of sexual maturity (Bustard 1980). This situation also obtained with many/most gharial reared in Indian zoos prior to the initiation of the Government of India/FAO/UNDP Crocodile Breeding and Management Project in 1975.

Nehru Zoological Park, Hyderabad, purchased two gharial from a dealer on 18 August 1966. Presumably they were freshly

caught. At this time they measured 1 m and 70 cm respectively and are known to have originated from Patna. These individuals were measured by us on 12 August 1979 and thereafter at six monthly intervals. The growth data are given in Table 1.

These individuals were shifted to the State Crocodile Complex, located within the Nehru

TABLE 1

GROWTH OF A PAIR OF SUB-ADULT GHARIAL AT NEHRU ZOOLOGICAL PARK, HYDERABAD (LENGTH IN M)

Date	Length	
	Male	Female
18-8-66	0.70 ¹	1.0
12-8-79	1.95	2.28
8-1-80	1.97	2.28
20-9-80	1.97	2.28
7-4-81	1.98	2.28

¹ The smaller (=younger) individual remained smaller throughout (Gowhar Ali Khan, pers. commn.)

TABLE 2

FEEDING REGIME JANUARY 1980 — JANUARY 1981 INCLUSIVE (WEIGHTS IN KG)

Month/year	Food provided	Dead fish removed	Food consumed
January 1980	10	3	7
February	10	4.3	5.7
March	17	4	13
April	12.5	2.5	10
May	10.5	1.4	9.1
June	10	—	10
July	5.9	—	5.9
August	7.7	0.2	7.5
September	13.5	1.5	12
October	11	—	11
November	10.4	1	9.4
December	12	1	11
January 1981	4	0.5	3.5

Zoological Park, on 8th January 1980 and thereafter their food consumption is known. The food fed, together with uneaten food removed, is given in Table 2 from which actual food consumption is calculated.

During the period August 1979 to April 1981, the female showed no recordable growth, and the male increased by only 3 cm.

These data are important as they indicate continuation of stunted growth even after rehousing and provision of a good, regular, fish diet.

The accommodation of these gharial prior to the transfer to the complex was in an enclosure with a 7 x 3 x 0.5 m deep pool with a 2 m land surrounding where they were housed together with three mugger crocodiles of 2.7, 2.3 and 1.6 m. all males. When housed in this enclosure the gharial used to enter the pool only when the mugger were on land. For the larger part of the day both gharial were at one corner of the enclosure. During the winter months, however, they started moving in the pool as the mugger occupied a burrow which they had dug under the wall.

The animals were fed once weekly with 2 kg of live fish and 5 kg of beef (which gharial do not take). The gharial fed only on the live fish not eaten by the mugger, as they were victims of the more aggressive mugger particularly during feeding times.

Following transfer to the complex the gharial were housed in a yearling pool measuring 5 x 4 x 1 m deep with a land area of 1.5 m surrounding the pool. They seldom/never basked.

Gharial hatch in June and at the time of obtaining these (August) the 70 cm individual was clearly a yearling being then 13-14 months old, and the 1 m individual was most likely to be 25-26 months old. Hence in 1979 these animals were 14-15 years old. Bustard and

Singh (1980) provided growth data on young gharial at the Gharial Research and Conservation Unit, Tikerpada, Orissa, for their first 4½ years of life. At three years their length averaged 218 cm with a range of 193-222 cm. Hence the two Nehru Zoological Park gharial at 14-15 years old were only the size of three year-olds showing normal growth. In crocodilians attainment of sexual maturity is size-related. The male, the sex of which was confirmed by cloacal probing and extrusion of the penis, which measured 4 cm, showed no signs of *ghara* development at a length of 1.98 m.

These data represent the most complete instances of stunted growth in the gharial known to us.

The male died on 8-4-1981 due to unknown causes being in good health the previous day. Dissection confirmed it to be completely sexually immature.

We also have growth data for two gharial reared at the Madras Snake Park between 1974-1976. Growth data for these two individuals, which also showed stunted growth are shown in Table 3. An individual measured 82 cm in June 1974 and should have attained about 110 cm in February 1976, (it was 96

TABLE 3

GROWTH OF TWO GHARIAL AT MADRAS SNAKE PARK, TAMIL NADU (LENGTH IN CM)

Date	Length	
	Individual 1	Individual 2
9-6-74	82.5	—
13-11-74	82.0	—
5-3-75	—	132*
9-5-75	92.5	132
22-2-76	96	135

* Obtained same day from Ahmedabad Zoo.
Note: Both individuals are thought to be females.

MISCELLANEOUS NOTES

cm) and the individual which measured 132 in March 1975 after a year should have measured 180-190 cm instead of a virtually unchanged length of 135 cm.

It is interesting to compare the growth rates in Orissa, at Nandankanan Biological Park, the only place to successfully breed gharial in captivity (Bustard & Maharana 1980). The male measured 135 cm in March 1963 (when it was considered to be 33 months old (Singh 1978) after 10 years it measured 2.5 m. Juvenile growth data recorded on a large number of gharial, at the Gharial Research and Conservation Unit, Tikerpada, also in Orissa, Bustard & Singh (1980) indicated that this growth was obtained on an average in two years at the time the gharial were 4 years old. Whereas the above male at Nandankanan showed an annual growth rate of 11.5 cm/year, the Tikerpada individuals were growing over the same size range at an average of 53 cm/year, or

more than 4½ times the growth achieved at Nandankanan, where the climate is also similar to that of Tikerpada. Clearly, therefore, this Nandankanan male was also stunted, as were the two females reared with the male which attained lengths of 2.5-2.65 m at an age of 12 ¾ years. In one year between January 1973 and January 1974 the 2.5 m male grew by only 6 cm, in two further years by 14 cm, and then showed no growth at all in the following year (Biswas, Acharjyo & Mohapatra 1978). Bustard and Maharana (1981) provide recent growth data for this group of gharial now rehoused in the breeding pool.

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